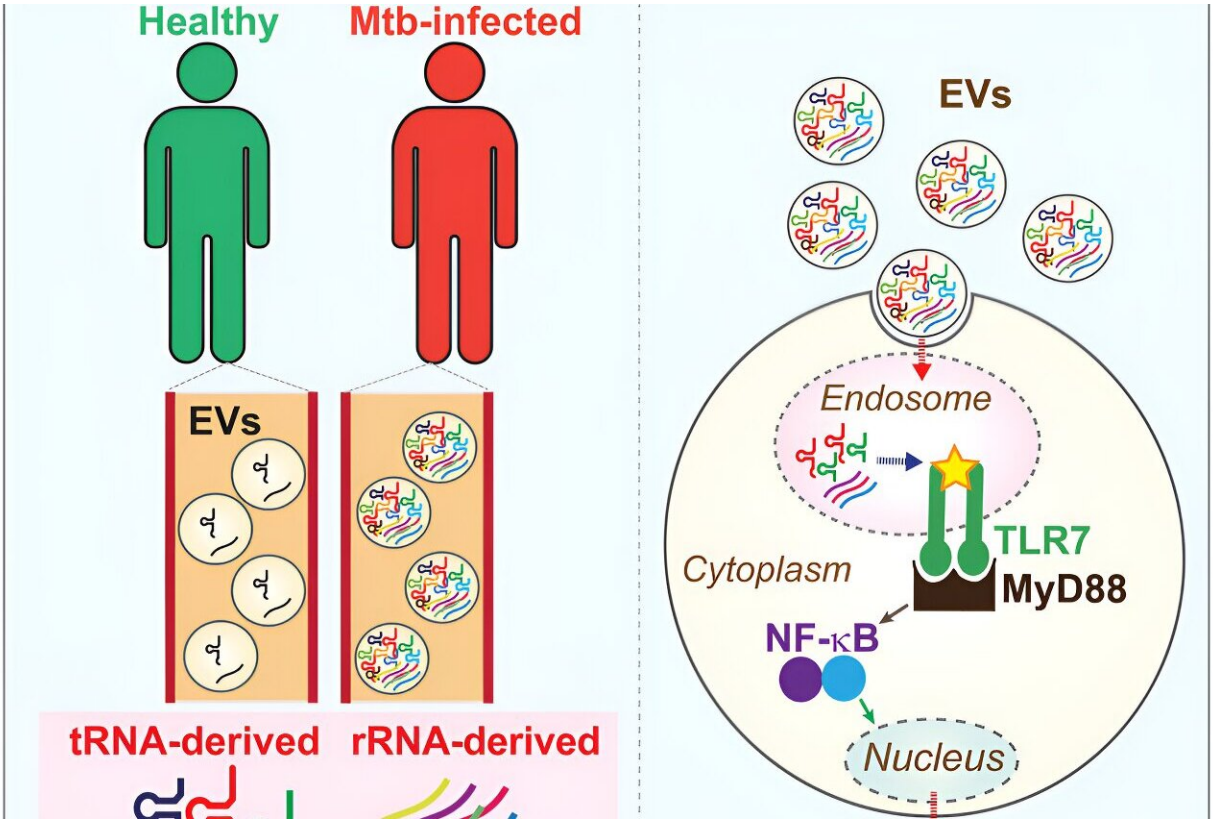
Small RNAs found to boost immune response to tuberculosis

August 28 2024, by Roni Dengler



Credit: *Molecular Therapy - Nucleic Acids* (2024). DOI: 10.1016/j.omtn.2024.102156

Tuberculosis kills about 1.3 million people each year, making it one of the most lethal infectious diseases in the world. Now, molecular biologist

Yohei Kirino, Ph.D. and his research team at Thomas Jefferson University has found that certain RNA molecules in people with tuberculosis are drastically different than those in healthy people.

The findings, published in the journal *Molecular Therapy Nucleic Acids*, reveal a potential pathway to bolster the immune system against infection.

Small RNA molecules known as short noncoding RNAs show up in the body in response to an infection. Sequencing RNA from a blood sample is one way to find out what kind and how much of different RNA molecules are present.

"However, our previous research showed that there are abundant amounts of short noncoding RNAs in infected cells that standard RNA sequencing is not catching," says Dr. Kirino.

In a study spearheaded by Ph.D. student Justin Gumas, the researchers modified the typical way to sequence RNA. Standard sequencing methods rely on two chemical features on the ends of RNA molecules that many short noncoding RNAs do not have.

So, the researchers first treated the samples with an enzyme that equipped every RNA molecule with these features. They were then able to sequence all of the short noncoding RNAs in people with tuberculosis and compare them with those in healthy people.

The team found many short noncoding RNAs that had not been sequenced before and many that activate the immune system. The findings not only reveal how small noncoding RNAs drive the immune system to respond to infection like tuberculosis, but also provide a pool of potential therapeutic targets and biomarkers for estimating the severity of the immune response.

"During an infection, we think these small noncoding RNAs work as an immune booster," says Dr. Kirino. "We believe there is an RNA pathway in the body that kick starts the immune response to tuberculosis infection."

More information: Justin Gumas et al, Immunostimulatory short non-coding RNAs in the circulation of patients with tuberculosis infection, *Molecular Therapy - Nucleic Acids* (2024). DOI: 10.1016/j.omtn.2024.102156

Provided by Thomas Jefferson University